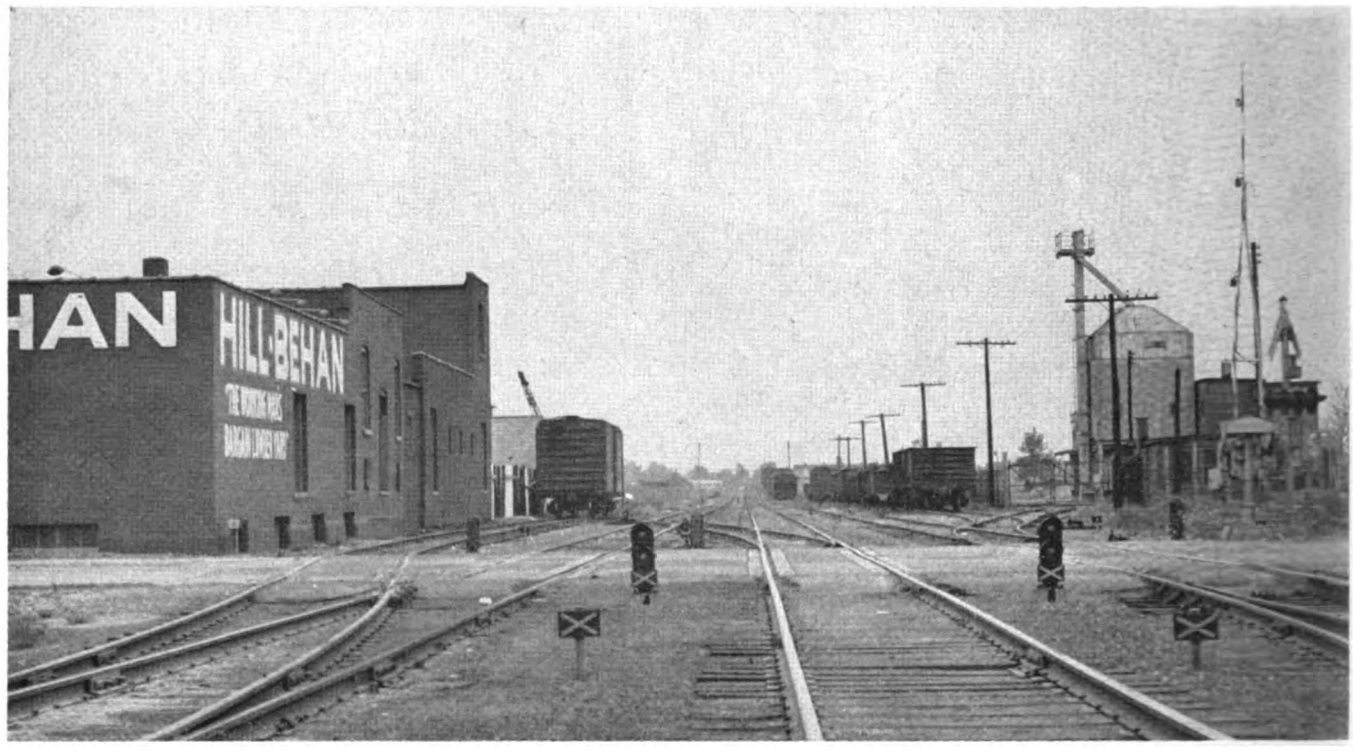


EACH CROSSING PROTECTION indicator like a two-aspect, color-light dwarf with an "X" below it

Crossing Gate Protection

With Indicators for Train Movements

Project on Terminal Railroad Association of St. Louis, includes special color-light dwarf signals, known as crossing protection indicators, which inform enginemen whether flashing-light signals and gates are operating, and give advance notice of time cut-outs

NEW PROTECTION HAS BEEN installed at a crossing of St. Clair Ave. and the tracks of the Terminal Railroad Association of St. Louis in East St. Louis, Ill. This crossing handles heavy local street traffic, and also through traffic. A count for 24 hr. over this crossing showed a total of 79 pedestrians and 14,629 street vehicles. In a period from 7 a.m. to 8 a.m. there were 793 vehicles, and in a second peak from 3 p.m. to 5 p.m., there were 2,550 vehicles.

The railroad tracks over this crossing are part of a connecting route extending from "SH" Madison interlocking on the north, to Dupo yards in the south part of East St. Louis. This line is used only for serving industries and for transfer of cuts of cars being interchanged between connections with various railroads. Train speeds over this crossing are limited to a maximum of 20 mph. In a typical 24-hr. period, there are about 102 train or switching moves over this crossing.

This crossing was formerly protected by two automatically operated flashing-light signals. The new protection consists of flashing-light signals and short-arm gates which block only the approaching traffic, the receding lanes being left open. A bell is mounted on the east flasher mast.

The new protection is automatically controlled by track circuits, but on account of switching moves to serve industries, special cut-out features were installed. As shown on the plan, the upper track over the crossing is a spur to an industry, the next two tracks are the mains, and the fourth track is a switching lead, from which spurs extend to industries.

Track circuits control the protection automatically when a train, in either direction, approaches on either main track. At the crossing on each main track, and on the spur as well as the switching lead, there is a separate track circuit which extends over the street and 50 ft. beyond in each direction. When any of these four crossing track circuits is occupied, the flashing-light signals operate and the gates go down and stay down, with no automatic cut out of any kind.

Based on maximum permissible speed of 20 mph, the approach control sections on the two main tracks are about 750 ft. to 780 ft. long. The flashing-light signals, bells and gate-arm lamps operate for about 5 sec.,

as a pre-warning before the gates are released; and the gates descend in about 10 sec. Thus the gates are down about 9 to 10 sec. before the train arrives at the crossing. Directional stick relays clear the gates after the rear of the train clears the crossing.

Time-Element Cut-Out

Many of the trains pass through at normal speed on the main tracks, but some trains stop on the approach sections, and leave cars standing on the main track while switching moves are made on industry spurs, without making a move over the crossing. Therefore, to prevent delay to street traffic, time cutouts were installed in connection with the approach controls on the two main tracks. On the average, a train arrives at the crossing about 25 sec. after entering an approach section. If the train stops on an approach, the flashing-light signals will cut out and the gates go up, 75 sec. after the train enters an approach.

Crossing Protection Indicators

This project includes 11 special wayside dwarf signals, known as crossing protection indicators, which inform enginemen whether the flashing-light signals and gates are protecting the crossing, and also these dwarfs give advance information of the termination of the operation of time cutouts to raise the gates. Each indicator, with one exception, is located at the immediate right of the track on which it governs. To distinguish these crossing protection indicators, each one has a small reflectorized cross-buck sign mounted at the bottom of the signal as shown in one of the pictures.

Typical Operation Cycle

As applying to each direction of approach to the crossing on each main track, there are two of these crossing protection indicators. For a westbound move on the westward track, there is an "outer indicator" "A" at the entering end of the approach section; and a "home" indicator "B" located 10 ft. from the curb line of the street. A crossing protection limit sign is located at the end of the separate track circuit across the street in approach of the "home" indicators to mark the end of that track circuit. The outer indicators such as "A" normally display green, and the home indicators such as "B" are normally dark.

Applying for a westbound move on the westward track, as the train approaches, the outer indicator "A" displays green, which informs the engineman that the controls are normal and that the gates and flashing-light signals will operate to protect the crossing for 75 sec. after the leading trucks of his locomotive passes indicator "A", i.e., enters the approach section. This drops the track relay which indirectly starts operation of the gate and flashing-light signals which will protect the crossing, and continue to do so if he proceeds at normal speed to the crossing.

Relation of Time-Elements

Included in the circuits for each approach section are two time-element relays, one of which operates in 60 sec., and the other in 75 sec. Both these relays are set in operation when the corresponding approach track relay drops. The stick relay of the 75-sec. relay, checks the stick relay of the 60-sec. relay up. At the end of the 60-sec. period, the "B" indicator at the crossing changes from green to red. At the end of the 75-sec. period, the approach control section, occupied by the train, is cut out of the control of the crossing protection, so that the gates are raised and the flashing-light signals cease to operate.

The change of aspect of the "B" indicator at the crossing, from green to red, as explained above, gives the engineman 15 sec. advance warning that the gates are to be raised and flashing-light signals cut out. Accordingly, if he is moving toward the crossing, he has time to bring his train to a stop short of limit sign in approach of indicator "B" which is about 50 ft. from the crossing.

When ready to move toward the crossing, either of two procedures can be followed to set the protection in operation and clear the indicator: (1) on all tracks except the spur, move the front truck of the locomotive (or leading car) past the crossing protection limit sign onto the track circuit over the crossing. This operates the flashing-light signals and lowers the gates. Then the aspect of the indicator "B" changes to green so the train can proceed over the crossing. (2) on the spur track, a member of the crew can use his switch key to operate the controller on a short pipe mast at the rear of the "B" indicator, which causes the flashing-light signals to operate and the gates to be lowered.

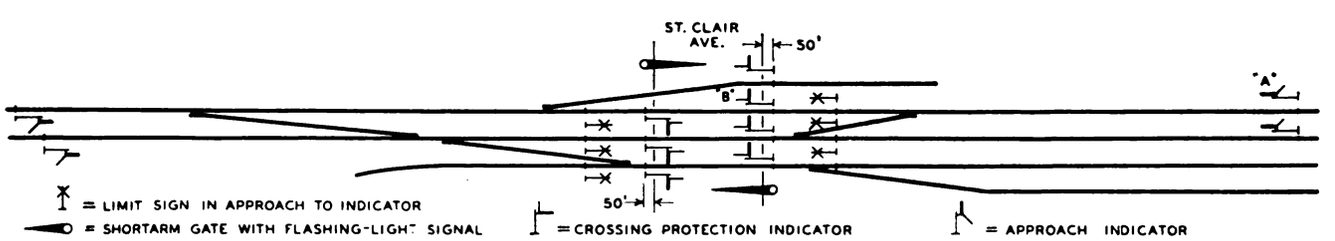
Lunar on Indicator "A"

As previously discussed, as a westbound train approached "outer" indicator "A", that indicator showed green if the controls were normal. On the other hand, if the approach section is occupied by a preceding move or the approach track circuit is de-energized for any reason, this "A" indicator would display a lunar aspect, rather than green. This lunar aspect indicates that an engineman is to reduce speed prepared to stop short of indicator "B" at the crossing.

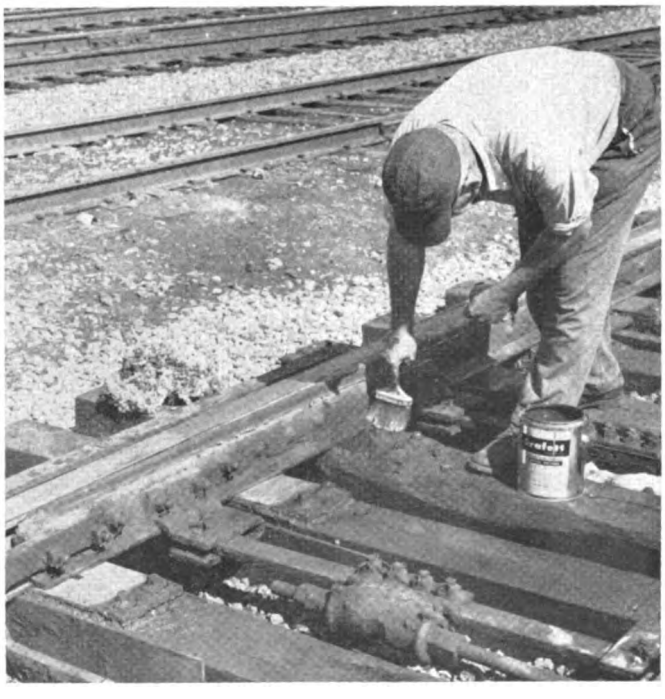
The relays on this installation, including the Model KB motor-driven, time-element relays, were made by the General Railway Signal Company. The crossing gates are the Western Railroad Supply Company's Model 10 with the No. 3564 mechanism including the drive-down feature from 90 deg. to 45 deg.

The operating battery consists of 10 Edison A6H cells, and each track circuit is fed by one cell of B4H. A 25-watt lamp, in a weatherproof fixture, mounted outside the relay case, is lighted normally on the a.c. supply. If section men, train crews, or other railroad men, see that this lamp is not burning, they notify the signal department at once, so that the maintainer can be called.

This crossing protection was planned and installed by railroad forces under the direction of O. E. Miller, signal engineer.



LOCATIONS OF INDICATORS are shown on this track and signal plan



Take Steam Cleaning To Your Switch Plates

The Illinois Central has conducted a test, using live steam at 120 lb. pressure, to clean old oil and dirt from switch plates, prior to the initial application of a new graphite type lubricant. The result was a saving in time compared with previous hand methods of cleaning, and the use of the new type lubricant not only provides uniformly easy operation of the switches, but also saves time compared with frequent oiling.

The steam was supplied by a portable oil-fired steam cleaner, manufactured by the Vapor Heating Corporation, and known as the Vapor Upgrader Junior Model 5090. This device includes a 6-gal. fuel oil tank, and a small gasoline engine to drive the power pump and blower. The cleaner, mounted in a housing on a hand dolly with rubber-tired wheels, weighs a total of 275 lb. For the test, this steam cleaner was placed on a track push car on which was mounted two 55-gal. steel drums for water supply. From a cold water start, the forced draft oil burner produces steam within 20 sec., and delivers volume steam, at up to 120 psi, within 3 min.

As an aid in breaking down the heavily caked layers of old oil and dirt on the switch plates, "Blast" detergent cleaning compound, made by the Du Bois Company, was injected into the steam flow in the steam gun. For each gallon of water supplied to the cleaner, about 2 oz. of detergent is fed to the steam gun.

One man, who had no previous experience, cleaned the bottoms of the switch points and the 22 slide plates on each No. 18 switch in 20 min. To do as good a job as possible by hand methods on each switch would require the same man 2½ hr. of scraping, washing, burning and sweeping. When the steam cleaning was complete, a dry rag was used to wipe off any dampness, and after a few minutes drying time, a liquid graphite base lubricant was applied with a brush. This lubricant quickly dries to a tack-free film that will not pick up or hold dust or sand blown by winds or passing trains. Having once cleaned the old oil from plates, and having applied this new graphite base lubricant, subsequent applications can be made after just sweeping the plates.

This test led to several conclusions: (1) the steam cleaning method is more efficient than hand cleaning, by scraping and sweeping; (2) use of the lightweight, portable, oil-fired steam cleaner is practicable either on a track push car with water drums, or where water is available from a hose, the generator could be used as an off-track unit, pushed by hand.

Top picture—Portable steam cleaning machine, and two 55-gal. drums for water supply, mounted temporarily on push car, moved to the eight interlocked switches

Center picture—A steam jet at 120-lb. is directed onto switch plate surfaces and under switch point, as well as into the flange between point and stock rail

Bottom picture—Graphite base lubricant, applied with a brush, quickly dries to a tack-free surface that will not hold any dust or the sand blown by wind or trains